Fuchs Umwelttechnik

OPERATING INSTRUCTIONS

Filtering Device Type MKF 105

Store carefully for future reference

GB

CE

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Hazards when operating the device

The filtering device is state-of-the-art technology and has been constructed according to the recognized technical safety regulations. Nevertheless, danger to life and limb of the operator or third parties or damage to the filtering device or other property can occur during operation, especially in the case of incorrect or improper use and application.



Every operator is therefore obliged

- to read and observe these operating instructions, paying particular attention to the notes on safety
- to contact the manufacturer for clarification in the event of queries
- to confirm by means of signature that knowledge of the safe operation of the filtering device has been acquired.



Name	Date	Signature

Correct Use

The sole function of the FUCHS Filtering Device is to extract the pollutants listed below. Use for any other purpose is classified as improper use of the filtering device.

Permitted Substances for Extraction	**Filter Combination Supplied: MKF FA4S**	
For dust,, fumes, gaseous contaminants and solvent vapours	TKF FB6	Safety filter bag EU5 with sealing tab
	MKF EU51	Preliminary filter mat for moist vapours (EU5) 575x270 mm
	MKF SF10	Cl. S submicron particulate air filter, Type-tested (DIN 24184) 99,99% separation efficiency 610x305x108 mm. Filter area 4.5 m²
	MKF A150	Gas filter with approx. 12.5 kg activated carbon incl. preliminary and after-filter mats 610x305x150 mm

Extraction of the following counts as improper use:

- damp or liquid substances
- sparking substances
- potentially explosive gases
- adhesive substances

Proper use also involves:

- observing all warnings and notes in the operating instructions and
- adhering to all inspection and maintenance schedules.

Further Documents

When working with hazardous substances, the appropriate accident prevention regulations are to be observed, in particular

☝ **ZH 1/140: Safety regulations for clean air at workplaces on systems**

User Assessment

These operating instructions are updated regularly. Your suggestions for improvement will assist us in designing operating instructions which are increasingly user-friendly.

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1. Product Description

1.1 Identification Data

Model/Type:	MKF 105
Serial Number:	
Order Number:	MKF 105
Purchase Order Number:	
Year of Construction:	
Filter Designation:	MKF FA4S
Additional modules:	
Colour:	5010/5015

Customer Entries

Inventory No.:	
Location:	

Documentation Data

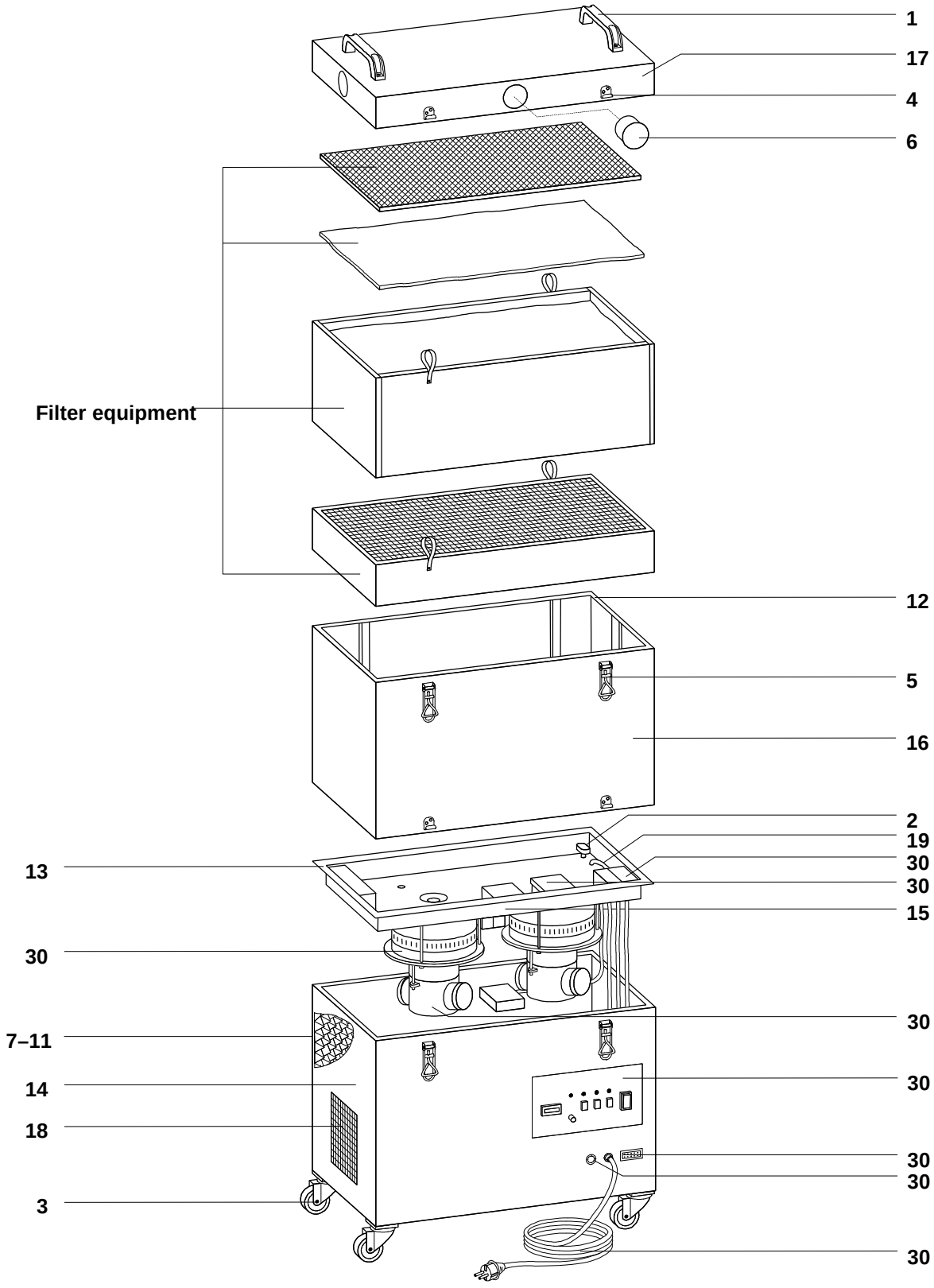
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Spare Part Ordering and Customer Service

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1.2 Complete View Pos. 1-19 Spare Parts List, Pos. 30 Electrical Spare Parts List

Filtering device Typ MKF



1.3 Technical Data

Device Type	MKF 105
Dimensions L x W x H [mm]	660x380x825bzw. 660x380x1280
Space Requirement for Filter Change L x W x H	
Weight [kg]	33
Extraction Power max. [m³/h]	270
Vacuum max. [Pa]	14000
Filter Equipment	MKF FA4S
Total Filter Surface [m²]	5,8
Active Carbon Filter, Weight [kg]	12,5; 15,1
Power Supply	
Voltage [V ; Hz]	400 / 50
Power Input [kW]	1,3
Rated Current [A]	2,8
Fuse	16 A slow-reacting
Perm. Ambient Temperature	+5 - +35 °C
Perm. Storage Temperature	+5 - +40 °C
Housing Material	powder-coated steel plate

1.4 Special Equipment

The version supplied has the following special equipment:

Pres.	Equipment
	Electronic speed regulator
	Electronic remote control with integrated On/Off Switch
X	Automatic remote switching
X	Connection for SPC control
	Ex protection
	24 V SPC output and potential-free converter
X	Prefilter monitoring
	Filter prewarning 95%
X	Direction of Rotation monitoring
X	Motor Control

1.5 Interfaces, Connections

- Interfaces: data lines, external control signals,
- position and type of the various connections

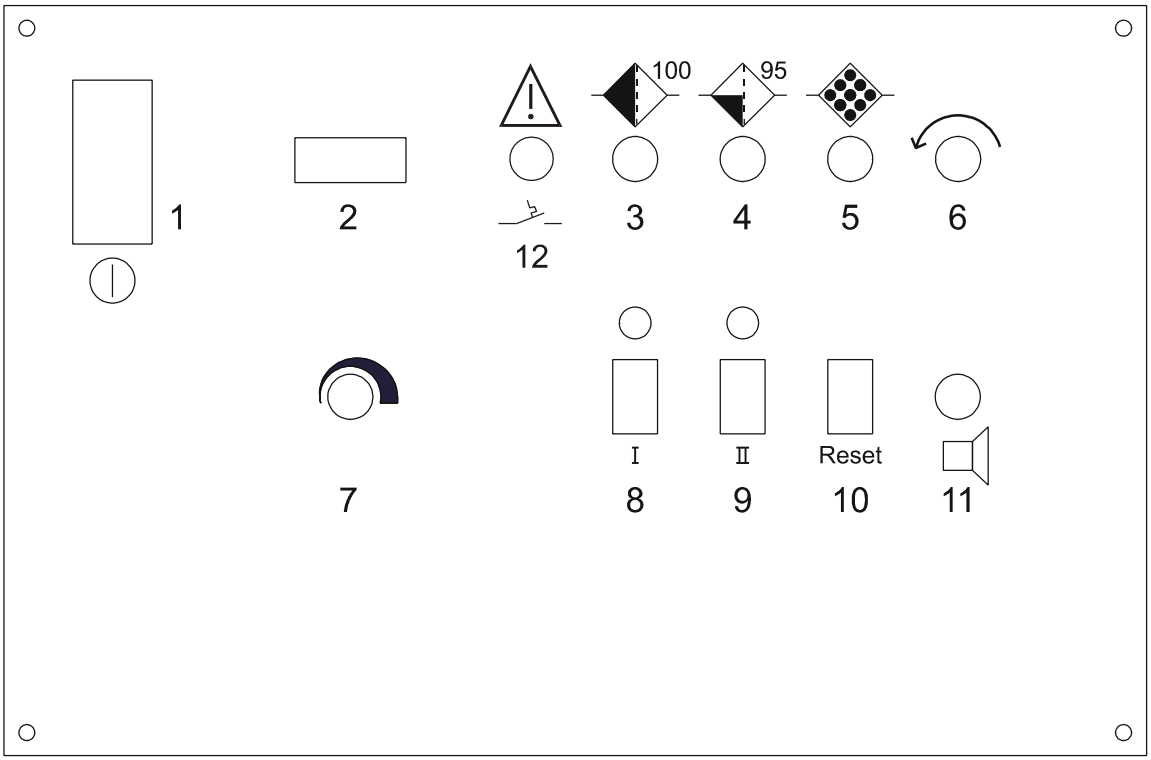
1. The connectors are under the operating display elements.

- **With Automatic Remote Switching (MKFFSAUT) Harting Plug**
  In combination with machine controls, the filtering device can be switched on and off via the control impulse of an SPS or other control. Contact Pin 1 and Pin 3 of the harting plug. Potentialfree contact (4,5,6) for status of turbine and filter.

- With 24 V Pegel DC potentialfree contact (DI 24)
Sub-D plug with 3 m cable.
Remote control with 24 V DC voltage (contact 9,4). Potentialfree contact (1,6) for status of turbine and filter.

- Potential-Free Output SPC – (MKF DI)
Harting plug. potentialfree contact (1,2,3) for status of turbine and filter.

1.6 Operating and Display Elements



1 Mainswitch ELHSCHA1	7 Potentiometer
2 Operating hours meter	8 Turbine I ESCHRA01
3 Filter closed 100%	9 Turbine II ESCHRA01
4 Filter 95%	10 Reset ESCHRQ01
5 Pre filter control	11 Beeper
6 Direction of rotation	12 Motorcontrol (red) 1000 h (yellow)

1.7 Noise Level at Filtering Device

The continuous sound pressure level emanating from the filtering device is 67 dB (A), depending on type.
Acoustic power level in accordance with CE (DIN 45635-3) 1m: 83 dB (A), depending on type

1.8 Symbols Used

 Notes on Safety	Information for operating personnel for protection against hazards
 Attention	Information concerning safe and proper operation
 Tip	Note on useful information concerning operation of the device

1.9 Special Hazard Areas

Hazard areas are, in particular:



- Replacing and disposing of contaminated filters

For tasks in this area, pay particular attention to the special safety regulations in the section "Hazards When Replacing Filters".

1.10 Changes to Conditions of Use:



The manufacturer must be consulted in all cases where changes to conditions of use occur ! In the event of improper extraction, there is a risk of damage to the health of the user.

2. Fundamental Safety Information

2.1 Observation of Information in Operating Instructions

- These operating instructions contain all the important information required to operate the filtering device safely and without malfunctions.
- Over and above this, the local rules and regulations regarding prevention of accidents are to be observed, in particular



  - ZH 1/140, Safety regulations for clean air at workplaces on systems

2.2 Obligation of the Operator

The operator is obliged only to allow those persons to work on the system who

- are familiar with the basic regulations regarding work safety and accident prevention and
- have been trained in handling the filtering device.

2.3 Training of Personnel

- Only trained and qualified personnel may work on the machine. This applies to all phases in the machine life-cycle such as transport, installation, putting into service, operation, maintenance, troubleshooting and, in particular, disposal of filters.
- The responsibilities of the personnel are to be clearly defined.
- Personnel in training are only permitted to work at the filtering device under the supervision of an experienced person.

2.4 Obligation of Personnel

All persons charged with work on the machine are obliged, before working on the filtering device for the first time:



- to read the operating instructions, especially the chapter on safety and the warning notes, and to confirm this with a signature.

2.5 Personal Protection Equipment

- The operator must provide the required personal protection equipment for the disposal of filters, in particular
  - protective gloves: (disposable polythene gloves)
  - breathing mask: fine-dust mask, tested at protection level 3

2.6 Safety Checks

- The functioning of the compact filtering device must be subjected to regular external checks for damage.

2.7 Informal Safety Measures

- The operating instructions are to be kept permanently at the filtering device.

2.8 Electrical Energy Hazards

- Work on the power supply may only be carried out by a qualified electrician.
- Check the electrical equipment of the machine regularly. Loose connections and defective cable inlets must be replaced immediately.
  - Switch off the power supply to the filtering device
  - Secure the main switch against unexpected switching on

2.9 Maintenance, Troubleshooting

- Carry out the prescribed maintenance work at the appointed times.
- When carrying out maintenance, inspection and repair work
  - deal with malfunctions immediately

2.10 Alterations to Construction of Filtering Device

- Do not make any structural alterations or extensions to the filtering device without the consent of the manufacturer.
- Components, especially filters, which are not in perfect condition must be replaced immediately.
  - Only use original spare parts and filters. Filters acquired from other sources provide no guarantee that the pollutants that occur are completely filtered out

2.11 Warranty and Liability

Our "General Terms and Conditions of Sale " apply in all cases. These are available to the operator
on conclusion of contract at the latest. Warranty and liability claims in the event of damage to property or
injury to persons are void if they are caused by one or more of the following:

- Improper uses of the filtering device.
- Improper installation, putting into service, operation, maintenance and disposal of the filtering device and the filters.
- Fitting damaged filters, or filters acquired form other sources
- Structural alterations to the filtering device carried out by operator
- Non-observance of the prescribed filter service life
- Improperly effected repairs
- The manufacturer has not been informed - or only partially informed - about the application and use of the filtering device.

3. Description of Function

3.1 Standard Function

- The filter combination removes pollutants from the extracted air
- The cleaned air exits via the side escape grille

3.2 Filtered Outgoing Air

For special requirements, the filtered air can be connected to a central outgoing air line via an escape connection point, e.g. in the case of

- clean-room conditions
- air-conditioned rooms or
- statutory requirements

The necessary accessories are available on request.

3.3 Filter Function

The filtering device works with a multi-stage mechanical filter system. Various filter combinations are used, depending on the pollutants to be extracted.

Pollutants for Extraction	Filters Used	Remarks
Coarse particles	• Filter mats/Filter bags • Pocket filter	with pre-separator, if required
Fine dusts and smokes	• Suspended matter filter, class S • Anti-static filter cartridges, category C	BIA-tested BIA-tested, cleanable
Gaseous pollutants such as solvents, glue vapors	• Active carbon filters	can be combined with filters for particles, fine dusts and smokes
Special cases such as aldehydes, amines, ammonia etc.	• Special filters	on request

The degree of separation
- for solid particles, depending on filtering equipment, is up to 99.99 %;
- for gaseous substances, is dependent on the type, concentration and composition of the gases

3.4 Safety and Monitoring Devices

3.4.1 Differential Pressure Measurement

A built-in differential pressure measurement monitors the level of contamination of the particle filter. On standard devices, the turbine switches off automatically in the event of a soiled particle filter.

☝ **Red control lamp** **Replace filter**

☞ The filtering device can only be switched on again after the filter has been replaced.

3.4.2 Turbine Monitoring

Depending on the type of filtering device, series-connection turbines, which have a service life of the first carbon brushes of approx. 800 operating hours, are used.
➔ In the event of wear, the turbines are switched off automatically.

4. Putting into Service

4.1 Installation and Operation Locations

- Set up the filtering device on a firm, even surface
  – in the case of models with casters, secure against unintentional rolling away
- Ensure that there is sufficient space to permit removal and replacement of filters (see Chap. 6)
- Do not set up in the immediate vicinity of heating elements.

4.2 Steps Prior to Initial Operation

Before putting into service:

- Check the filters for external damage
- Raise the cover module or open the filter maintenance hatch, as appropriate. Check the fitted filters for
  – possible damage
  – correct seating
- Close the cover module/filter maintenance hatch; ensure that the seating is airtight

4.3 Connections

Electrical Connection

- Only to be carried out by qualified skilled personnel
- in the case of automatic operation ensure that:
  – the forced connection to the system requiring extraction is effected
  ➔ The system must not be operated without a functioning extraction



Mechanical Connection

- Prepare the collection equipment for the extraction (in accordance with ZH 1/140)
- In the event of more than one extraction location, eliminate mutual influences
- Attach the collection equipment to the connection on the filtering

4.4 Initial Operation

- Switch on the device
  ➔ all control lamps are off (with the exception of the On/Off switch)

Possible Malfunctions

Malfunction	Possible cause	Remedy
• Control lamp direction of fan rotation lights up	Phase of the three-phase AC supply is not - or is incorrectly - connected	– Have checked and rectified by an electrician
• Filter control lamp lights up	Leak in the seating of a filter module	– Insert filter module correctly – Press exit key – If necessary, check seals for damage
• Extraction device switches off	Motor overheated	– Check extraction lines

5. Maintenance

5.1 One-Off Maintenance for Filtering Device with Belt Turbine

After approx. 100 hours of service

- Check the drive belts of the turbines
  – if necessary, re-tension

As a rule, the extraction turbine requires no maintenance. The service life depends on the conditions of use and lies between 3 000 and 8 000 hours of service.
➔ When replacing the belt, observe the required pre-tension of 1 % belt length

☺
- mark a stretch of 100 mm on the untensioned belt
- pull the belt on to the wheel
  ➔ The marked stretch should now measure 101 mm.

Should there be another value, alter the distance between the axles appropriately

5.2 Regular Maintenance and Checks

Check regularly, at least every 4 weeks:

- airtight seating of the hose connections
- pre-tension of the clamping fasteners
- seating of the housing seals between the filters
  – In the event of damage, replace immediately
- function of the control lamps
- air temperature at escape grille
  In the event of high temperatures (approx. 70 °C), check:
  – filter monitoring in working order?
  – extraction lines and hoses free?

5.3 Factory Overhaul

In order to ensure continuous perfect functioning, we recommend a factory overhaul

- approx. every 1000 hours of service
- after 2 years at the latest

5.4 Replacing Carbon Brushes: only by qualified personnel !

Turbines with disconnecting carbons are used in various filtering devices. The turbine is thus switched off automatically before the collector is damaged.

- Unplug the device /Switch off the power supply to the filtering device
- Remove the filter module
- Unscrew the floor plate
- Pull out the turbine flange cover
- Replace the disconnecting carbons

After replacing the disconnecting carbons a second time, check the collector.

- In the event of heavy wear, replace the entire turbine

6. Safety Regulations for Changing Filters

6.1 Hazards while Replacing Filters

Replacing contaminated filters in an improper manner represents a considerable health risk to those carrying out the replacement and their immediate surroundings.



- **You must therefore observe the following safety rules for filter replacement without fail !**
- **Breathing masks and protective gloves must be used for filter replacement.**
- **Particle and gas filters are subject to statutory regulations regarding special waste and are to be disposed of according to their level of pollutant contamination.**

Breathing Mask

- Use fine-dust masks, tested at protection level 3

Hand protection

- Use long disposable polythene gloves

6.2 Replacing Contaminated Filters

6.2.1 When to Replace Filters

- when the red control lamp lights up
  ➔ the extraction turbine switches off automatically
- a short time after the filter pre-warning lamp (accessory) lights up
  ➔ 3/4 of the filter capacity has been reached.

6.2.2 Replacement Filters

- Make sure that you use the correct replacement filters.
  The type of filter used in your filtering device is listed in these operating instructions in the Technical Data section.

Only filters as prescribed by the manufacturer may be used. These filters have been specially adapted to the prevailing conditions. In the case of other filters, there is a risk of damaging emissions as a result of inadequate filtering !

6.2.3 Filter Replacement Procedure



- Release the clamping fasteners on the upper section of the filtering device and remove the cover module
  ➔ The filters are now accessible

Dependent on the level of equipment, filter combinations of various materials are used:

- Metal mesh filter
- Prefilter mat
- Suspended matter filter
- Safety filter bag
- Filter cartridge
- Active carbon filter

Metal Mesh Filter

- check and clean regularly approx. every 1-2 months:
  - beat out filter
  - use a steam jet to clean extremely soiled filters

Prefilter Mats

- carefully fold up the filter mat
  (contaminated side inwards)
- pack in an airtight polythene bag
- dispose of in accordance with regulations



Under no circumstances should the prefilter mat be cleaned !

Suspended Matter Filter
Replace suspended matter filter, when
- the red control lamp doe not go out in spite of new prefilter mat
- the filter is physically damaged

As a general rule, the suspended matter filter is to be replaced after approx. 10 prefilter mats have been used up. This takes place as follows:

- hold the suspended matter filter by the two tabs/loops
- carefully lift out of the housing
- pack in an airtight polythene bag
- dispose of in accordance with regulations



- **Under no circumstances should the suspended matter filter be cleaned, blown out or vacuum-cleaned !**
- **Under no circumstances should the filter surface of a new suspended matter filter be touched (risk of damage, leading to inadequate filtering)**
- **Never use damaged filters !**

Fitting a New Suspended Matter Filter
- Fit new suspended matter filter (place on seal)
- Observe the air-flow arrow on the suspended matter filter housing
- Switch on the filtering device

- Press the exit key

➔ The turbine starts up



Caution ! Do not reach into the turbine while it is running

- Switch off the filtering device at the on/off switch
- Re-assemble the device
- Switch on the filtering device and continue operation

Safety Filter Bag
- Release the clamping fasteners
- Remove the cover module
- Carefully pull the safety filter bag off the extraction connection point in the cover module
- Immediately close by means of the self-adhesive fastening tab
- Pack in an airtight polythene bag
- dispose of in accordance with regulations



Under no circumstances should the safety filter bag/sack be cleaned !

Fitting a New Safety Filter Bag

- When fitting, handle the filter with care. It is sensitive to pressure and knocks.
- Slide the new safety filter bag on to the extraction connection point as far as it will go
- Press the exit key on the turbine flange cover

➔ Turbine starts up



Caution ! Do not reach into the turbine while it is running

- Switch off the filtering device at the on/off switch
- Re-assemble the device
- Switch on the filtering device and continue operation

Pocket Filter

- Switch off the filtering device at the on/off switch
- Release the clamping fasteners
- Remove the cover module
- Carefully lift the pocket filter out of the housing
- Pack in an airtight polythene bag
- dispose of in accordance with regulations



Under no circumstances should the pocket filter be cleaned !

Fitting a New Pocket Filter

- Insert the pocket filter with care in the supporting frame.
- Re-assemble the device
- Switch on the filtering device and continue operation

Removing the Filter Cartridge

- Release the clamping fasteners and remove the cover module
- Take off the filter holding plate (Types MKF, INR, TKF)
- Remove hexagon nut (Type TKF-D)
- Remove the filter cartridge and, depending on level of soiling, clean.

Cleaning Filter Cartridge

Soiling caused by	**Clean**	**Notes**
dry dust	•with broom	Not in direct vicinity of unprotected persons
dry, non-toxic dusts and smokes	•using vacuum cleaner	The vacuum cleaner must have at least the same level of separation as the filter cartridge of category "C". Otherwise, the extracted fine dusts will leave the vacuum cleaner in an unfiltered state.
	Blow out with compressed air, from inside to outside	Only in suitable rooms. Under no circumstances in the vicinity of unprotected persons.
sticky soiling	•Wash with soap water or soft steam jet	Dry out the filter cartridge completely! Check the seal for damage before re-fitting

Active Carbon Filter
An active carbon filter is used up after an increase in weight of approx. 25 - 30 %.
A used-up active carbon filter emits pollutants to the surrounding environment.



- It should be removed as soon as it is used up !

For technical reasons, an optical display for used-up active carbon filters is not possible.

Determine the state of the active carbon filter in the following manner:

1. Increase in weight of the filters by 25-30 % compared to original weight
   Example: original weight: 12 kg, replace at approx. 16 kg
2. Occurrence of unpleasant smells
3. Excess of 800 operating hours (average value)
4. After one year of use (average value)

Full active carbon filters must either

- be disposed of as special waste
- or reactivated as recovered material

☺ We are happy to advise you on suitable possibilities for disposal and recycling.

7. Filtering Device with Accessories

7.1 With Electronic Speed Regulator

Please note:

- Only switch on device at highest power level
  – as required, set 30 - 100 % extraction power
- In the lower regulation area up to 50 %, only use for short periods (1-2 hours).
  – when operating for longer, the service life of the turbines is considerably reduced

7.2 With Electronic Remote Control

The electronic remote control allows you to

- adapt the extraction power to the individual local conditions
- switch the filtering device on and off
  – for this purpose, set the main switch to switch position I
- When shutting down, switch off both the remote control **and** the main switch

7.3 With Automatic Start-Stop

Automatic switching on and off of the filtering device. Particularly suitable for use with welding equipment.

- Attach the welding cable sensor to the earth cable of the welding apparatus
  ➔ when welding starts, the extraction switches on automatically
  ➔ approx. 15 sec. after the welding job has been completed, the extraction switches itself off
  – short welding jobs do not interrupt the extraction

Switching off the automatic start-stop:

- press the black toggle switch
  – the extraction turbine remains permanently switched on and extracts continuously

7.4 With Automatic Remote Switching

In combination with machine controls, the filtering device can be switched on and off via the control impulse of an SPS or other control.

- Insert multiple-pin plug-in contact
- Program the switching function

7.5 With Potential-Free Output

Possibility for an external display of the function of the filtering device in combination with monitored machines and systems.

- Connection via multiple-pin plug-in contact

7.6 With 24 V Pegel

Connecting external 24 V DC for starting the engine.

Potential free switch on SubD Connector.

7.7 Regulating Three-Phase Turbines with Frequency Converters

1. by means of external potentiometer (R>KΩ)
2. by means of differential pressure transmitter
3. by means of step switch
4. by means of external control voltage

The frequency converter is adjusted to the respective equipment. In the event of modifications, malfunctions or technical queries, please consult Fuchs Umwelttechnik P+V GmbH.

8. Appendix

8.1 Software Description

A. Start: Each time the unit is switched on, a function test of the four 8mm LEDs and the Piezo beeper is carried out. The operating hours counter is activated as soon as a a turbine is switched on.

B. Stand - by In stand-by mode, the function test can be activated manually at any time by pressing the Reset button.
In stand-by mode, the direction of rotation and phase failure are also continually monitored. In event of a failure, the DR LED is switched on. The LED can be extinguished after the voltage has been corrected by pressing the Test button. As long as the LED for direction of rotation is lit up, the PLC receives a signal at the PLC interface.

C. 1 Motor: If you want to put a motor of the system into operation,switch on either Switch no. 1 or no. 2. After switching on and a time delay of 12 seconds, the following sensor inputs are constantly monitored:
- Direction of rotation with shutdown of the turbines after 3 seconds
- Sensor ‘100 %’
- Sensor ‘95 %’ (Option)
- Sensor ‘Prefilter’ (Option)
- Sensor ‘Flow’ (Option)
- Sensor ‘Motor monitoring 1’ (Option only for PLC interfacing)
- Sensor ‘Overcurrent relay’ (only 3-phase current)

The following outputs are set as soon as s sensor switches:

Inputs	Outputs
Direction of Rotation	LED DR, SPS DR
100 %	LED 100%, PLC, beeper
95 %	LED 95%, PLC, beeper
Prefilter	LED Prefilter, PLC, beeper
Flow	PLC, beeper
Motor monitor 1	PLC motor monitor
Overcurrent relay	PLC motor monitor

The sensor outputs (except beeper) also remain set if you switch to stand-by and the sensor inputs are still active. The operator thus recognises that he has to carry out service work. The displays can be reset by pressing the Reset button. Reset button can only pressed if the turbines stand still.

Switching off the Motor
After approx. 5 seconds the motor switches off as soon as one of the following inputs is activated:
- Flow
- 100 %
- Prefilter

The fault message can be cancelled by pressing the Reset button.

D. 2 Motors

If you want to put both motors into operation (option) switch on the remaining switch. The second turbine is always switched on after a 1.5 second delay. After switching on, the following sensor inputs are constantly monitored:

- Direction of rotation with shutdown of the turbines after 3 seconds.
- Sensor ‘100 %’
- Sensor ‘95 %’ (Option)
- Sensor ‘Prefilter’ (Option)
- Sensor ‘Flow’ (Option)
- Sensor ‘Engine monitoring 2’ (Option)
- Sensor ‘Overcurrent relay’ (only 3-phase)

The following outputs are set as soon as s sensor switches:

Inputs	Outputs
Direction of Rotation	LED DR, SPS DR
100 %	LED 100%, PLC, beeper
95 %	LED 95%, PLC, beeper
Prefilter	LED Prefilter, PLC, beeper
Flow	PLC, beeper
Motor monitor 1	PLC motor monitor
Overcurrent relay	PLC motor monitor

The sensor outputs (except beeper) also remain set if you switch to stand-by and the sensor inputs are still active. The operator thus recognises that he has to carry out service work. The displays can be reset by pressing the Reset button.

Switching off the Motors

After approx. 5 seconds both motors switch off as soon as one of the following inputs is activated:

- Flow
- 100 %
- Prefilter

The fault message can be cancelled by pressing the Test button.

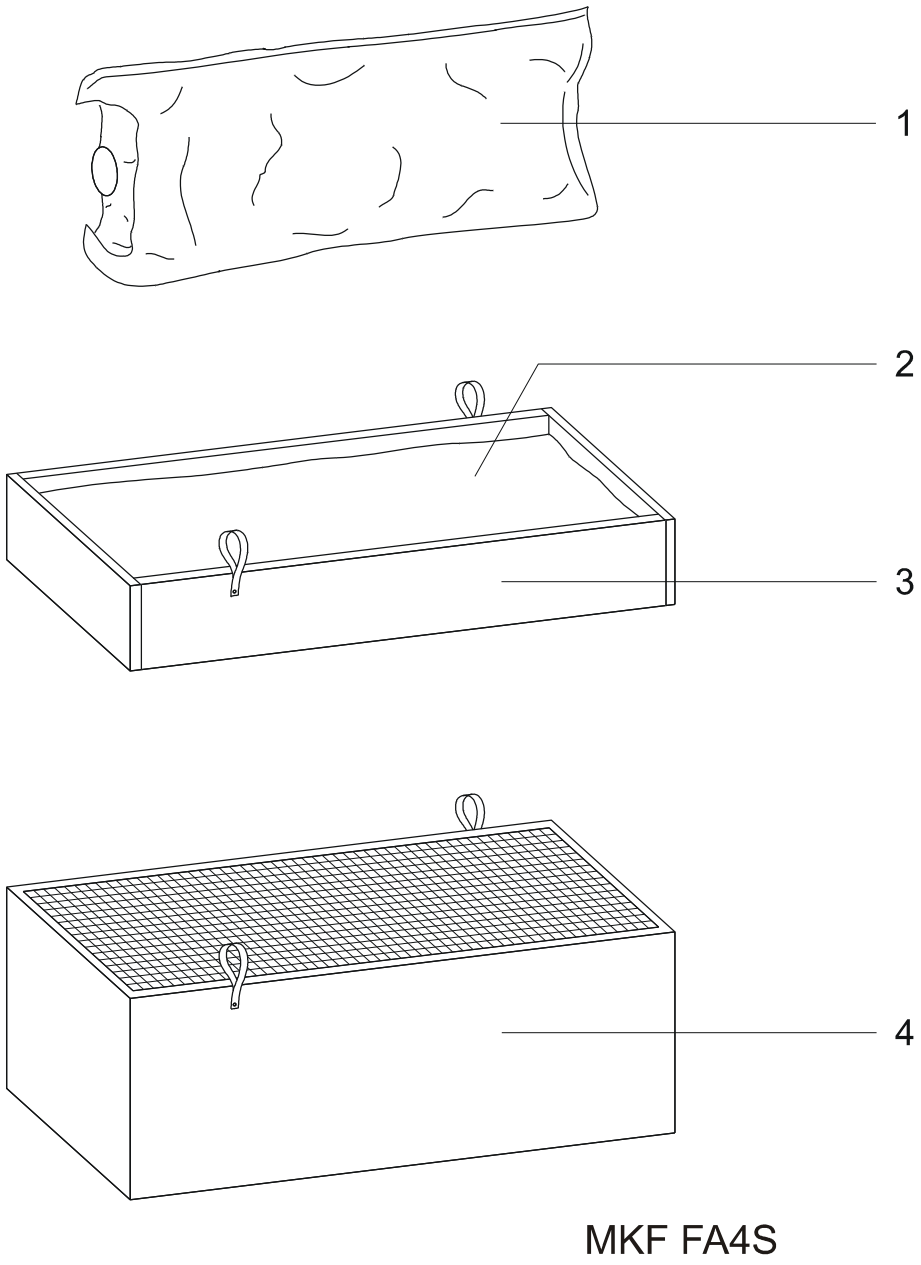
OPTIONS FOR PLC INTERFACING

A. All the above-stated functions can be monitored via the remote-control interface. In addition, the turbines can be cut in.
The PLC is provided with a short-circuit-proof operating voltage of + 24 VDC. To cut in the turbines, the PLC must apply the 24 VDC to the control unit, i.e. the PLC outputs must be potential-free relay outputs, or PNP semiconductor ouputs.

B. The outputs of the control unit the PLC are designed as open collectors. This means that an active output of the control unit is connected to earth. Max. permissible voltage per output is 40 mA; the total power consumption must not exceed 200 mA.

C. The sensor inputs of the control unit are also short-circuit-proof. A voltage of 24 VDC per sensor is available. As soon as the sensor switches, the voltage at the inputs is detected.

8.2 Sketch of the Filter Equipement



MKF FA4S

8.3 Spare Parts List of the Filter Equipment

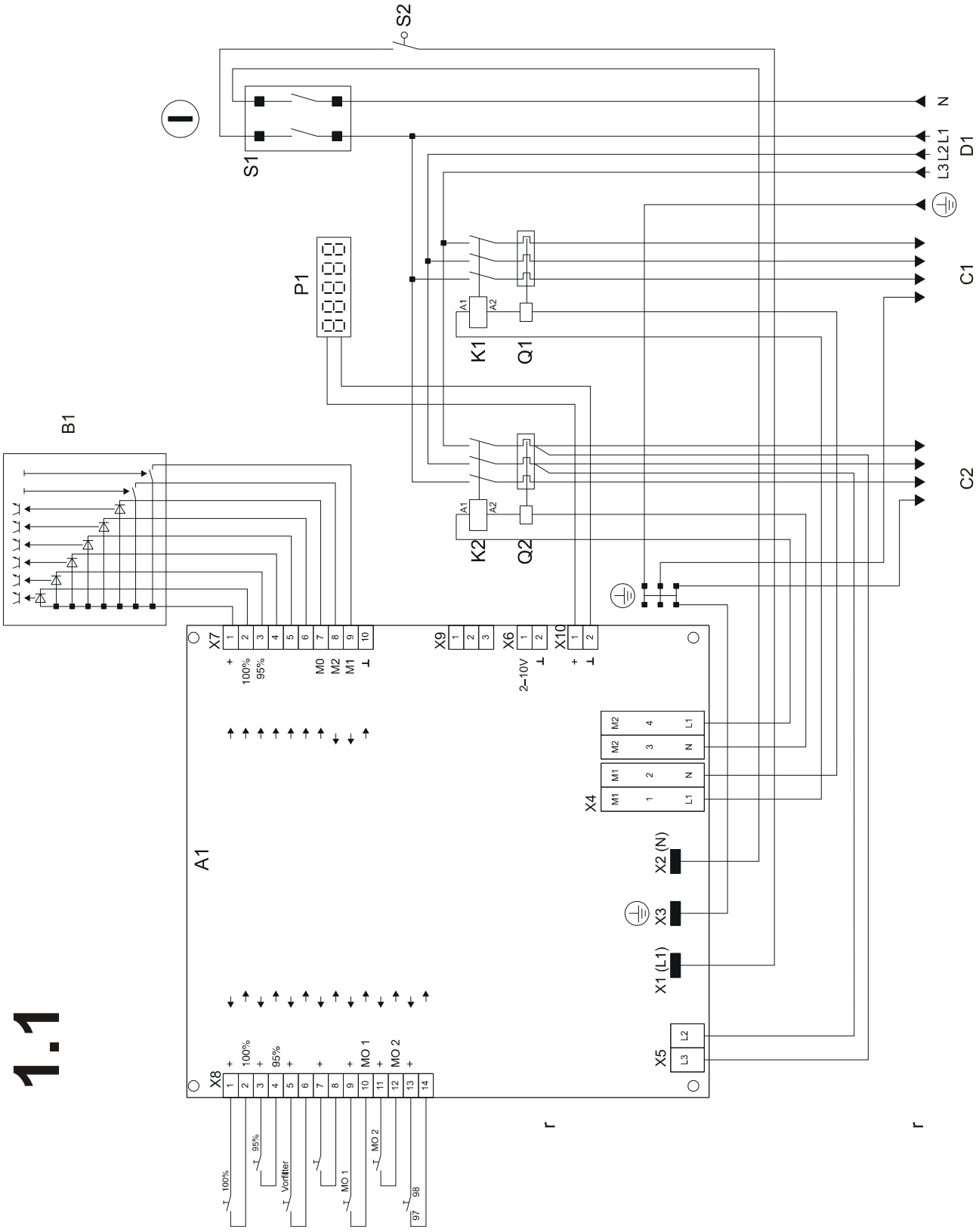
Permitted Substances for Extraction	**Filter Combination Supplied: MKF FA4S**	
For fumes, gaseous contaminants and solvent vapours	TKF FB6	Safety filter bag
	MKF EU51	Pre filter mat EU51
	MKF SF10	Particulate air filter
	MKF A150	Gasfilter

8.4 Spare Parts List of the Filtering Device

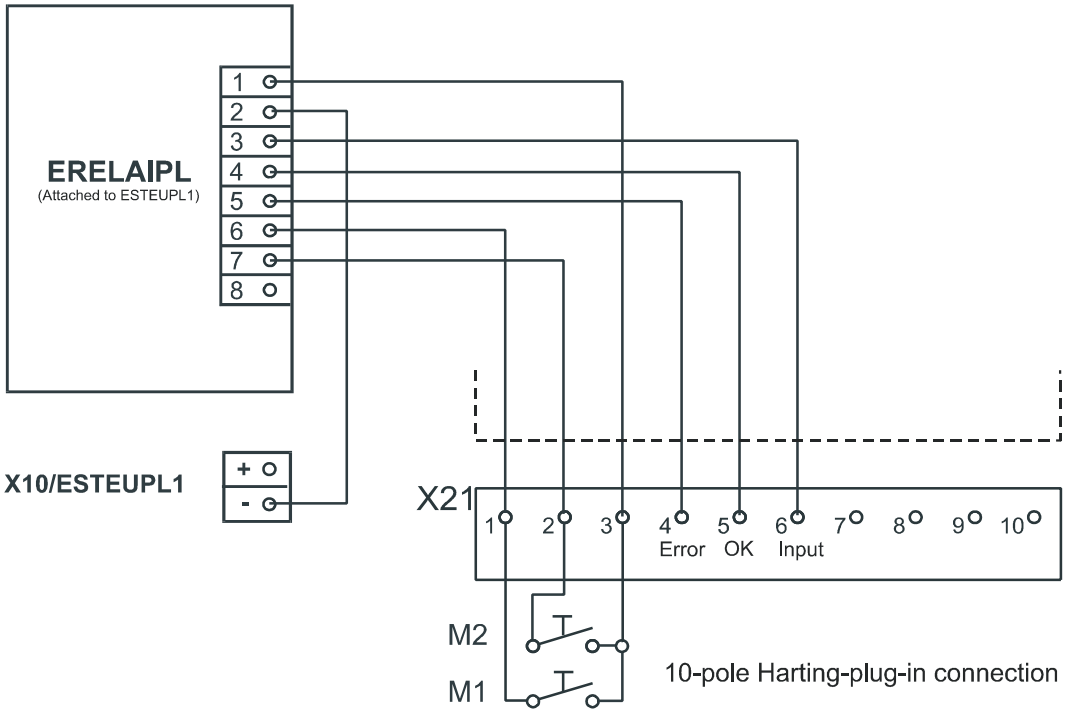
Pos	Q ty	Description	Order No
1	2	Bow-type handel	BSTBG003
2	4	Cap for bow-type handel	BSTBG004
3	4	Swivelling wheel	BSTLR005
4	8	Closing hooks, galvanized	BSTSH101
5	8	Fasteners, galvanized	BSTVS102
6	3	Stoppers	BSTVST50
12	1	Seal 355x660x7 mm for flange cover	DI EPF01
13	1	Seal 355x655x7 mm for filter module	DI EPF04
14	1	Fan module	XMKF101
15	1	Flange cover	XMKF203
15.1	2	Seal ring for VT DK165	DIRIDK
15.2	1	Blow module for VT DK165	VTANSDK
15.3	1	Belt	VT FLR01
16	1	Filter module	XMKF302
17	1	Cover module	XMKF401
18	1	Blower cover	XLG0201
19	2 m	Hose TR SI, white	PN01.07
20	2	Screwed connection	PN02.01

8.5 Electrical Circuit Diagram

(description of the Pos. No. see next page)



Key of electrical circuit diagram 1.1			
Number:			**Description**
1.1			**Fuchs masterboard of three phases motors**
A1			Masterboard
"	X1		Phase Masterboard
"	X2		N-cable
"	X3		PE-cable
"	X4		Motor output
"	X5		Connector for direction of rotation detection
"	X6		Output for AC motors 2-10 V
"	X7		PLC-Interface
"	X8		Sensor inputs
"	X9		Potentiometer
"	X10		Connector for operating hours meter
"	X7		
"	"	4	Prefilter
"	"	5	Direction of rotation
"	"	6	Beeper
"	X8		
"	"	5	Prefilter output
"	"	6	Prefilter input
"	"	7	Air flow control output
"	"	8	Air flow control input
"	"	13	Overcurrent output
"	"	14	Overcurrent input
B1			PLC-Interface
P1			Operating hours meter
S1			Masterswitch
S2			Saftyswitch
K2			Contactor
K1			Contactor
Q2			Motor protective relay
Q1			Motor protective relay
C1			Motor1
C2			Motor2
D1			Feed cable



Switching performance FSAUT		
Situation	Contact between: 5-6 (OK)	4-6 (error))
Equipment switched off / on standby		
Equipment running properly	X	
Coarse filter saturated		X
Advance filter warning 95%		X
Main filter saturated 100 %		X
Motor monitoring activated		X
M1: Start motor 1 via external voltageless contact		
M2: Only for equipment with 2 motors. start motor 2 via external voltageless contact. (motor 1 must be switched on first)		
Pin 4-6: Voltageless contact assemblies (Imax=1A). Input of extra-low voltage to be made via pin 6. Evaluation via Pin 4 and Pin 5.		

8.6 Electrical Spare Parts List

Pos	Q ty	Description	Order No
A1	1	Masterboard with front plate	ESTEUPL1
S1	1	Master switch	ELHSCHA1
S2	1	Safety switch (only MKF)	EZULSICH
100%	1	Differential pressure switch	EDIFF01
S4	1	Reset	ESCHRQ01
Vorfilter	1	Pressure switch	EDIFF06
M1	1	Turbines	VT DK165
	4	Distance module	VTTH02
K1	1	Contactor	EDILEM10
	1	RC-element	ELRCGL
Q1	1	Overload relay	EDILZE10
	2	Dummy	EV209101
	1	Cable gland PG13,5	EKVME013
	1	Nut PG13,5	EKVM013
X4	1	Connector for motor outputs	ESTMOT
X8	2	Connector for sensor inputs	ESTSENS
X5	1	Connector for direction-of-rotation-	ESTDREHR
	1	Dummy	ELABDE01
	1	Dummy	ELABDE03
	1	Dummy	ESCHRM01
	1	Feed cable 5x1.5mm²	EZULDREH
	1	Cable 2x0.5mm²	EZULDUNG
	2	Cable PE	EERD2
	2	Cable for pressure switch	EZULDRU
X8	1	Connector for sensor inputs	ESTSENS
X21	1	Plug female 10-pols	EWABU
X21	1	Plug male 10-pols	EZULFSAU
X21	1	Hood 10-pols	EWATU
X21	1	Housing 10-pols	EWAAB
P1	1	Operating hours meter	ESTEUBZ1
B1	1	Relay plate	ERELAIPL

8.7 Filter Designation

Order Ref.	Q.ty	Description	Application
MKF A08	1	Gas filter with approx. 6,0kg activated carbon incl. Preliminary and after-filter mats 610x305x78 mm	Solvent vapours, gaseous contaminants (See list concerning contaminants)
MKF A150	1	Gas filter with 12,5 kg activated carbon incl. Preliminary and after-filter mats, 610x305x150 mm	Solvent vapours, gaseous contaminants (See contaminants list)
MKF A150J	1	Gas filter with approx. 12.5 kg activated carbon incl. Preliminary and after filter mat EU5, 610x305x150 mm	Hydrogen sulphide
MKF A150P	1	Gas filter with approx. 15 kg special activated carbon incl. Preliminary and after filter mat EU5 610x305x150 mm	For ammoniac vapours
MKF A265	1	Gas filter with approx. 23,5 kg activated carbon incl. Preliminary and after filter mats 610x305x265 mm	Solvent vapours, gaseous contaminants (See contaminants list)
MKF OF11	1	Oxydation filter (approx 1kg)	Aldehydes, ketones
MKF OF24	1	Oxydation filter (approx. 24kg)	Aldehydes, ketones
MKF OF45	1	Oxydation filter (approx. 45 kg)	Aldehydes, ketones
MKFMF03	1	Woven metal filter 305x270x25 mm	Roughing filter
MKF VF	1	Anti-static, cleanable polyester fleece filter cartridge, Category „C“ with 2,5 m² filter area	Cleanable filter cartridge for dry fumes and dusts
TKF FB6	1	Safety filter bag EU5 with sealing tab	For preliminary separation of large quantities of dust. Important when contamination-free filter changing is required e.g. hazardous dusts.
MKF FB6	1	Safety filter bag F6 with sealing tab	For preliminary separation of large quantities of dust. Important when contamination-free filter changing is required e.g. hazardous dusts.
KADRMKF1	1	Distance frame for MKF DAKT with activated carbon cassette 610x305x72 mm	

Order Ref.	Q.ty	Description	Application
MKFSF18Y	1	Class S high efficiency submicron particulate air filter with cover module , Type-tested (DIN 24184) 99,997% 600m3/h 99.999% -300m3/h separation efficiency 610x305x180 mm Filter area 4.5m²	Rauche
MKFTZMRO	1	Filter modul 600x300x300 mm	
MKFZM1	1	Filter modul 155 mm	
MKFZMFB2	1	Filter modul 660x355x270 mm	
INRZM	1	Filter modul 160 mm	
INRZM1	1	Filter modul 280 mm	
FIHORAHM	1	Frame 610x305x78 mm	
MKF MF01	1	Woven metal filter 575x270x15	Roughing filter
MKF EU51	1	Preliminary filter mat for moist vapours (EU5) 575x270 mm	Moist vapours (Standard)
MKFEU52	1	Preliminary filter mat for moist vapours (EU5) 610x305 mm	Moist vapours
MKF EU91	1	Preliminary filter mat for viscous vapours (EU9) 575x270 mm	High portions of visous vapours (soldering fume); preliminary filter for high efficiency submicron particulate air filter
MKF EU92	1	Preliminary filter mat for viscous vapours (EU9) 610x305 mm	High portions of viscous vapours (soldering fume); preliminary filter for high efficiency submicron particulate air filter
MKF SF08	1	Class S high efficiency submicron particulate air filter, Type-tested (DIN 24184) 99,997% 600m3/h 99.999% -300m3/h separation efficiency 610x305x78 mm Filter area 5,7m²	Ultra-fine particulate, fumes
MKF SF10	1	Class S high efficiency submicron particulate air filter, Type-tested (DIN 24184) 99,997% 600m3/h 99.999% -300m3/h separation efficiency 610x305x108 mm Filter area 5,7 m²	Ultra-fine particulate, fumes

Order Ref.	Q.ty	Description	Application
MKF SF18	1	Class S high efficiency submicron particulate air filter, Type-tested (DIN 24184) 99,997% 600m3/h 99.999% -300m3/h separation efficiency 610x305x180 mm Filtering surface 5,7 m²	Ultra-fine particulate, fumes
MKF TEU3	1	Pocket filter	Prefiltering of large quantities of dust
MKF TEU5	1	Pocket filter F5	Prefiltering of large quantities of dust
MKFTF7	1	Pocket filter F7	Prefiltering of large quantities of dust
FIMAPZY	1	Pasteboard filter cell PZY 150 305 x 610 mm,with central fitting hole and cover paper and integrated filter EU5	Ultra-fine particulate

8.8 Filter Combinations

Order No.	Application	Components		
		Q.ty	Order No.	Description
MKF FA1	For fumes and small quantities of gaseous contaminants and solvent vapours	1	MKF MF01	Woven metal filters 575x270x15 mm
		1	MKF EU51	Preliminary filter mat for moist vapours (EU5) 575x270 mm
		1	MKF SF18	Cl. S submicron particulate air filter, Type-tested (DIN 24184) 99,99% separation efficiency 610x305x180 mm. Filter area 4.5 m²
		1	MKF A08	Gas filter with approx. 6.0 kg activated carbon incl. preliminary and after-filter mats 610x305x78 mm
MKF FA1S	For dust, fumes and small quantities of gaseous contaminants and solvent vapours	1	TKF FB6	Safety filter bag EU5 with sealing tab
		1	MKF EU51	Preliminary filter mat for moist vapours (EU5) 575x270 mm
		1	MKF SF18	Cl. S submicron particulate air filter, Type-tested (DIN 24184) 99,99% separation efficiency 610x305x180 mm. Filter area 4.5 m²
		1	MKF A08	Gas filter with approx. 6.0 kg activated carbon incl. preliminary and after-filter mats 610x305x78 mm
MKF FA1T	For dust, fumes and small quantities of gaseous contaminants and solvent vapours	1	MKF TEU5	Pocket filter
		1	MKF EU51	Preliminary filter mat for moist vapours (EU5) 575x270 mm
		1	MKF SF18	Cl. S submicron particulate air filter, Type-tested (DIN 24184) 99,99% separation efficiency 610x305x180 mm. Filter area 4.5 m²
		1	MKF A08	Gas filter with approx. 6.0 kg activated carbon incl. preliminary and after-filter mats 610x305x78 mm
MKF FA2	Only for solvent vapours and gaseous contaminants	1	MKF MF01	Woven metal filters 575x270x15 mm
		1	MKF A265	Gas filter with approx. 23.5 kg activated carbon incl. preliminary and after-filter mats 610x305x265 mm
MKF FA3	Only for fumes, without gaseous contaminants and without solvent vapours	1	MKF MF01	Woven metal filters 575x270x15 mm
		1	MKF EU51	Preliminary filter mat for moist vapours (EU5) 575x270 mm
		1	MKF SF18	Cl. S submicron particulate air filter, Type-tested (DIN 24184) 99,99% separation efficiency 610x305x180 mm. Filter area 4.5 m²
		1	MKF SF08	Cl. S submicron particulate air filter, Type-tested (DIN 24184) 99,99% separation efficiency 610x305x78 mm. Filter area 4.5 m²

Order No.	Application	Components		
		Q.ty	Order No.	Description
MKF FA3S	Only for dust and fumes, without gaseous contaminants and without solvent vapours	1	TKF FB6	Safety filter bag EU5 with sealing tab
		1	MKF EU51	Preliminary filter mat for moist vapours (EU5) 575x270 mm
		1	MKF SF18	Cl. S submicron particulate air filter, Type-tested (DIN 24184) 99,99% separation efficiency 610x305x180 mm. Filter area 4.5 m²
		1	MKF SF08	Cl. S submicron particulate air filter, Type-tested (DIN 24184) 99,99% separation efficiency 610x305x78 mm. Filter area 4.5 m²
MKF FA4	For fumes, gaseous contaminants and solvent vapours	1	MKF MF01	Woven metal filters 575x270x15 mm
		1	MKF EU51	Preliminary filter mat for moist vapours (EU5) 575x270 mm
		1	MKF SF10	Cl. S submicron particulate air filter, Type-tested (DIN 24184) 99,99% separation efficiency 610x305x108 mm. Filter area 4.5 m²
		1	MKF A150	Gas filter with approx. 12.5 kg activated carbon incl. preliminary and after-filter mats 610x305x150 mm
MKF FA4S	For dust,, fumes, gaseous contaminants and solvent vapours	1	TKF FB6	Safety filter bag EU5 with sealing tab
		1	MKF EU51	Preliminary filter mat for moist vapours (EU5) 575x270 mm
		1	MKF SF10	Cl. S submicron particulate air filter, Type-tested (DIN 24184) 99,99% separation efficiency 610x305x108 mm. Filter area 4.5 m²
		1	MKF A150	Gas filter with approx. 12.5 kg activated carbon incl. preliminary and after-filter mats 610x305x150 mm
MKF FA4T	For dust,, fumes, gaseous contaminants and solvent vapours	1	MKF TEU5	Pocket filter
		1	MKF EU51	Preliminary filter mat for moist vapours (EU5) 575x270 mm
		1	MKF SF10	Cl. S submicron particulate air filter, Type-tested (DIN 24184) 99,99% separation efficiency 610x305x108 mm. Filter area 4.5 m²
		1	MKF A150	Gas filter with approx. 12.5 kg activated carbon incl. preliminary and after-filter mats 610x305x150 mm
MKF FA5	For fumes and small quantities of dust	2	MKF VF	Anti-static, cleanable polyester fleece filter cartridge, category "C" with 2.5 m² filter area

Order No.	Application	Components		
		Q.ty	Order No.	Description
MKF FA6	For welding fumes	1	MKF MF03	Woven metal filters 305x270x25 mm
		2	MKF VF	Anti-static, cleanable polyester fleece filter cartridge, category "C" with 2.5 m² filter area
		1	XMKF D503	Fitting frame and mounting kit
MKF FA7	For fumes and large quantities of dust	2	TKF FB6	Safety filter bag EU5 with sealing tab
		2	MKF VF	Anti-static, cleanable polyester fleece filter cartridge, category "C" with 2.5 m² filter area
		1	XMKF D503	Fitting frame and mounting kit
MKF FA8	For fumes, emulsion spray and solvent vapours	1	MKF EU5M	Macrofalt filter cassette EU5, filter area 2.2 m²
		1	MKF EU5MH	Fitting frame for macrofalt filter cassette
		1	MKF EU51	Preliminary filter mat for moist vapours (EU5) 575x270 mm
		1	MKF SF10	Cl. S submicron particulate air filter, Type-tested (DIN 24184) 99,99% separation efficiency 610x305x108 mm. Filter area 4.5 m²
		1	MKF A08	Gas filter with approx. 6.0 kg activated carbon incl. preliminary
MKF FA9	For fine dust and fumes	1	MKF EU5M	Macrofalt filter cassette EU5, filter area 2.2 m²
		1	MKF EU5MH	Fitting frame for macrofalt filter cassette
		1	MKF EU51	Preliminary filter mat for moist vapours (EU5) 575x270 mm
		1	MKF SF18	Cl. S submicron particulate air filter, Type-tested (DIN 24184) 99,99% separation efficiency 610x305x180 mm. Filter area 4.5 m²
MKF FA11	For dust and fumes	1	MKF PZYF5	Prefilter module for contamination free filter changing
		1	MKF SF18Y	Cl. S submicron particulate air filter with cover module, Type-tested (DIN 24184) 99,99% separation efficiency 610x305x180 mm. Filter area 4.5 m²

8.9 Additional filter modules

Order No	Description	Application
MKF DAK	Additional gas filter module,complete and ready for installation incl. 12,5 kg activated	Solvents, gaseous contaminants
MKF DPZY	Cover module for contamination free filter changing in combination with filter equipment MKF FA11	
MKF DMFS1	Cover module to build in safety filter bag EU5 with sealing tab (Add-on-kit)	For preliminary seperation of large quantities of dust. Necessary for filter equipment MKF FA1S, MKF FA3S, MKF
MKF DMFS2	Cover module to build in safety filter bag EU5 with sealing tab (in new unit)	For preliminary seperation of large quantities of dust. Necessary for filter equipment MKF FA1S, MKF FA3S, MKF
MKF ZM	Additional filter module complete with fasteners. 660x370x270mm	
MKF ZMDM	Additional filter module with cover module for the inlet	
MKF TZM	Additional filter module to build in pocket filter EU3 or EU5	
MKF DAKT	Additional gas filter module to install a 6 kg activated carbon cassette	
MKF ZM1	Additional filter module complete with fasteners. 660x370x160mm	

8.10 Technical Data / Overview of Units

Unit type / Order Ref.	Number of turbines	Carbon brush life	Q max m3/h	P max Pa	Supply voltage/ rating kW	Special features
MKF 101	1	2000 h	210	19000	230V/1,1	Thermal overload
MKF 102	1	2000 h	210	19000	230V/1,1	Electr. controler
MKF 103	1	-	263	12430	230V/1,2	Single-phase AC
MKF 103D	2	-	520	12430	230V/2.4	Single phase AC
MKF 104	1	-	263	12430	230V/1,2	Single-phase AC
MKF 105	1	-	270	14000	400V/1,34	Three-phase AC
MKF 106	1	-	270	14000	400V/1,34	Three-phase AC with elect. controler
MKF 107	1	-	270	14000	400V/1,34	Explosion protected motor Ex(e) G3
MKF 108	1	800 h	180	25500	230V/0,95	Unsuitable for continuous operation
MKF 109	1	800 h	180	25500	230V/0,95	Electr. controler
MKF 113	2	800 h	360	25500	230V/1,9	Extremly high suction for intermittent operation
MKF 114	2	800 h	360	25500	230V/1,9	Electr. controler
MKFSV15	1	--	90	11500	400V/0,37	Unit suitable for continuous operation e.g. direct extraction at the soldering iron
MKFSV35	1	--	130	16000	400V/0,55	Unit suitable for continuous operation e.g. direct extraction at the soldering iron